NON-PUBLIC?: N
ACCESSION #: 9007020128
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Susquehanna Steam Electric Station - PAGE: 1 OF 3
Unit 2

DOCKET NUMBER: 05000388

TITLE: Automatic Reactor Shutdown Due to High Vessel Water Level Caused by Feedwater Level Transmitter Failure
EVENT DATE: 05/28/90 LER #: 90-005-00 REPORT DATE: 06/27/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: T. S. Ryder - Power Production TELEPHONE: (717) 542-3235
Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JB COMPONENT: AMP MANUFACTURER: R369
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

At 0256 hour on May 28, 1990, an automatic actuation of the Reactor Protection system occurred on Unit 2. The unit had been operating at 100% rated power prior to the actuation. Feedwater control system transmitter PDT-C32-2N004B failed downscale which resulted in the feedwater master controller increasing to 100% demand. Reactor water level increased from the steady state level of +35 inches to +54 inches. When vessel level reached +54 inches, the main and feed pump turbines tripped. Tripping of the Main Turbine resulted in a fast closure of the turbine stop and control valves. Fast closure of the turbine stop and control valves resulted in a reactor scram. The lowest vessel level observed during the transient was approximately -26 inches. The Reactor Core Isolation Cooling system was manually initiated to restore reactor vessel level to an acceptable value. A component failure in the

amplifier circuit card for feedwater control system transmitter PDT-C32-2N004B caused the transmitter to fail downscale which in turn resulted in the feedwater master controller increasing to 100% demand. The event has been determined to be reportable per 10CFR50.73 (a) (2) (iv), in that an automatic actuation of the Reactor Protection system occurred when the feedwater level transmitter failed
The event was
within the design basis of the plant and system responses which were needed to mitigate the consequences of the event actuated. The event did not pose any significant safety consequences and there was no compromise to the health and safety of the public. The amplifier circuit card in PDT-C32-2N004B was replaced with a new amplifier card and the transmitter was recalibrated. The failed amplifier circuit card is being sent to Rosemount to perform a failure analysis to determine exact cause of failure.

END OF ABSTRACT

DESCRIPTION OF EVENT

On 0256 hours on May 28, 1990, an automatic actuation of the Reactor Protection System (RPS, EIIS Code: JC) occurred on Unit 2. The unit had been operating at 100% rated power prior to the actuation. Feedwater control system transmitter PDT-C32-2N004B failed downscale which resulted in the feedwater master controller increasing to 100% demand. Reactor water level increased from the steady state level of +35 inches to +54 inches (215 inches above the top of active fuel). When vessel level reached +54 inches, the main and feed pump turbines tripped. Tripping of the Main Turbine resulted in a fast closure of the turbine stop and control valves. Fast closure of the turbine stop and control valves resulted in a reactor scram. The lowest vessel level observed during the transient was approximately -26 inches (135 inches above the top of active fuel). The Reactor Core Isolation Cooling (RCIC, EIIS Code: BN) system was manually initiated to restore reactor vessel level to an acceptable value. At 0300 hours, Operations personnel reset one feed pump and placed it in service. The RCIC system was then shutdown at 0305 hours.

CAUSE OF EVENT

A component failure in the amplifier circuit card for feedwater control system transmitter PDT-C32-2N004B caused the transmitter to fail downscale which in turn resulted in the feedwater master controller increasing to 100% demand. Feedwater flow to the reactor vessel

increased to satisfy the 100% demand signal and vessel level reached the +54 inch main turbine trip setpoint. The amplifier circuit card is being sent to Rosemount to perform a failure analysis to determine exact cause of failure.

REPORTABILITY/ANALYSIS

The event has been determined to be reportable per 10CFR50.73 (a) (2) (iv), in that an automatic actuation of the Reactor Protection System occurred due to the failure of a level transmitter within the Feedwater Control System. The instrument failure resulted in the feedwater master controller increasing to maximum flow demand.

The most severe increased coolant inventory event similar to this particular occurrence is a feedwater controller failure during maximum flow demand, 105% nuclear boiler rated (NBR) steam flow. The feedwater controller failure transient is described in Section 15.1.2 of the Final Safety Analysis Report (FSAR). The transient described in this Licensee Event Report occurred while the plant operated at 100% rated power and therefore was less severe than that described in the FSAR.

The important system operational actions for the feedwater controller failure event are high water level tripping of the main turbine, turbine stop valve scram trip initiation, recirculation pump trip (RPT, EIIS Code: AD), and low water level initiation of RCIC and High Pressure Coolant Injection (HPCI, EIIS Code: BJ)) to maintain long term water level control following tripping of feedwater pumps. Reactor vessel level did not decrease to the HPCI system initiation setpoint. As such, HPCI did not actuate. RCIC was manually initiated to restore vessel level. All other important system operational actions did occur. Since the event was within the design basis of the plant and system responses which were needed to mitigate the consequences of the event actuated, this transient did not pose any significant safety consequences and there was no compromise to the health and safety of the public.

A special report under a separate letterhead will be issued in accordance with Technical Specification 4.7.3.d to report the RCIC injection associated with the event.

CORRECTIVE ACTIONS

The amplifier circuit card in PDT-C32-2N004B was replaced with a new amplifier card and the transmitter was recalibrated. The failed card was then momentarily installed in a spare transmitter and it was confirmed

that the circuit card was the actual problem. The failed amplifier circuit card is being sent to Rosemount to perform a failure analysis to determine exact cause of failure.

ADDITIONAL INFORMATION

Failed Component Identification: Pressure Transmitter Amplifier Circuit Card; Manufacturer - Rosemount, Inc.

Previous similar events involving increased feedwater flow reactor vessel level transients include LER 85-023-00 (Docket 388), 87-013-00 (Docket 387), and 89-002-00 (Docket 387). None of these previous events were the result of the component failure of a feedwater control system transmitter amplifier circuit card.

ATTACHMENT 1 TO 9007020128 PAGE 1 OF 1

Pennsylvania Power & Light Company
Two North Ninth Street o Allentown, PA 18101 o 215/770-5151

June 27, 1990

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 90-005-00
FILE R41-2
PLAS - 430

Docket No. 50-388
License No. NPF-22

Attached is Licensee Event Report 90-005-00. This event was determined reportable per 10CFR50.73 (a) (2) (iv), in that an actuation of the Reactor Protection System occurred due to an instrument failure in the feedwater control system.

H. G. Stanley
Superintendent of Plant - Susquehanna

TSR/mjm

cc: Mr. T. T. Martin
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